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Immobilization of hexavalent chromium by fly ash-based geopolymers

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Abstract

In this paper the immobilization of hexavalent chromium (Cr (VI)) by fly ash (FA)-based geopolymers was investigated, depending on FA characteristics, mechanical activation of FA, geopolymer synthesis conditions and concentration of Cr added. The effectiveness of Cr immobilization was determined via investigation of geopolymer compressive strength and Cr leaching. Structural changes of geopolymers during the Cr immobilization were assessed by means of gas adsorption, XRD, and NMR analysis. FA reactivity was a key factor determining both physical-mechanical and immobilizing properties of geopolymers. Mechanical activation of FA caused an increase of both geopolymer strength and effectiveness of Cr immobilization. The presence of Cr induced physical-mechanical and structural changes in geopolymers. The correlation between concentration of Cr leached and geopolymer physical-mechanical and structural parameters was established.

Key words: B. mechanical properties, B. physical properties, B. environmental degradation, E. powder processing, geopolymers

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